

Claims

What is claimed is:

1. In a disc drive having a plurality of tracks and a magneto resistive (MR)  
5 head positioned above the tracks to access magnetic information stored on the tracks  
and a thermal asperity detector circuit operably connected to the MR head, a method of  
detecting and measuring instability within the MR head comprising steps of:

setting a threshold in the thermal asperity detector operably connected to the MR  
head;

10 applying a read bias to the MR head;  
reading a signal emanating from the MR head positioned over an erased track;  
counting a number of occurrences of signals that exceed the threshold; and  
determining transducer magnetic instability for the MR head based on the number  
of occurrences of signals that exceed the threshold.

15 2. The method in claim 1, further comprising:  
adjusting the read bias to a new value within a range of values, the range of values  
based on a characteristic of the MR head; and  
repeating the steps of reading, counting, and determining.

20 3. The method in claim 2, further comprising:  
re-setting the thermal asperity detector to a new threshold; and  
repeating the steps of reading, counting, and determining.

25 4. The method in claim 3 further comprising:  
realigning magnetic domains within the MR head if the number of signal  
occurrences exceeds a pre-determined number.

30 5. A computer readable medium having computer-executable instructions for  
performing the steps recited in claim 4.

6. A method for detecting transducer magnetic instability in a magneto-resistive (MR) head in an operating disc drive, the method comprising steps of:

setting a signal threshold in a thermal asperity detector in a disc drive read channel circuit;

5 setting a read bias in the read channel circuit;

reading an erased track on a disc in the drive to detect a signal emanating from the MR head; and

counting an occurrence of the signal if the signal exceeds the signal threshold.

10 7. The method in claim 6, further comprising:

re-setting the read bias to a new bias; and

repeating the reading and counting steps.

8. The method in claim 7, further comprising:

15 performing the re-setting and repeating steps for a pre-determined number of repetitions.

9. The method in claim 7, further comprising:

20 performing the re-setting and repeating steps until there are no occurrences of signals that exceed the threshold.

10. The method in claim 8, wherein the pre-determined number of repetitions is five (5).

25 11. The method in claim 8, further comprising:

re-setting the signal threshold to a new signal threshold; and

repeating the setting of a read bias, the reading on a erased track, and the counting of signal occurrences.

30 12. The method in claim 11, further comprising:

repeating the re-setting of the signal threshold for a pre-determined number of repetitions.

13. The method in claim 12, further comprising:

setting a first criterion based on a characteristic of the MR head;

comparing the counted number of occurrences of the signals that exceed the

5 threshold to the first criterion to determine a reliability value to the MR head.

14. The method in claim 13, further comprising:

rejecting the MR head if the reliability value is outside a second criterion.

10 15. The method in claim 13, further comprising:

re-aligning magnetic domains within the MR head based on the reliability value.

16. The method in claim 6, further comprising:

attenuating the signal emanating from the MR head to a level within a range of

15 pre-determined signal thresholds.

17. The method in claim 6, further comprising:

amplifying the signal emanating from the MR head to a level within a range of

pre-determined signal thresholds.

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18. A computer readable medium having computer-executable instructions for performing the steps recited in claim 8.

19. A computer readable medium having computer-executable instructions for

25 performing the steps recited in claim 11.

20. A computer readable medium having computer-executable instructions for

performing the steps recited in claim 13.

21. An apparatus for detecting and measuring instability in a magneto-resistive (MR) head in an operating disc drive, the MR head having a magnetic orientation and positioned over a pre-determined track on a disc in the drive, the apparatus comprising:

a thermal asperity detector circuit in a read channel of the disc drive operably connected to the MR head, the thermal asperity detector having an adjustable threshold set to a pre-determined value; and

a means for utilizing the thermal asperity detector circuit to determine magnetic instability.

22. The apparatus in claim 21, further comprising:

a read bias applied to the MR head, the bias selected from a range of values, the values based on the MR head resistance to a magnetic field; and

a signal generated by the MR head, the MR head positioned over an erased track.

23. The apparatus of claim 22 wherein the apparatus further comprises:

a means for adjusting the bias to re-orient the magnetic domains within the MR head based on the number of occurrences of signals exceeding the pre-determined threshold value.

24. The apparatus in claim 21, further comprising:

a software module operably connected to the thermal asperity detector comparing a signal from the MR head to the pre-determined threshold, the MR head positioned over an erased track, the software module counting occurrences in which the signal exceeds the pre-determined threshold value.

25. The apparatus in claim 21, further comprising:

a means for generating a signal by the MR head, the MR head positioned over an erased track; and

a means for comparing the signal to the pre-determined threshold, counting occurrences in which the signal exceeds the pre-determined threshold value.

26. The apparatus of claim 23 wherein the software module further comprises:  
a comparator operably connected to the read channel comparing the signal from  
the MR head to the pre-determined threshold value; and  
a counting unit operably connected to the comparator counting occurrences in  
5 which the signal exceeds the pre-determined threshold value.

27. The apparatus of claim 23 wherein the thermal asperity detector is  
operably connected to the MR head via a pre-amplifier and the software module is  
operably connected to the thermal asperity detector via the pre-amplifier.

28. The apparatus of claim 21 wherein the apparatus further comprises:  
a means for adjusting the signal emanating from the magneto-resistive head, the  
adjustment attenuating/amplifying the signal to a level within the range of settings for the  
threshold.